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UNDER SECRETARY FOR HEALTH'S INFORMATION LETTER

WEST NILE VIRUS

1. Background

a. The West Nile virus is a member of the family Flaviviridae, which includes a group of viruses that cause illness in humans, including encephalitis. The flaviviruses are approximately 40-60 nm in size, are enveloped with icosahedral nucleocapsid, and have single-stranded Ribonucleic Acid (RNA).

b. West Nile virus is a relatively recently identified organism that was first isolated in the West Nile district of Uganda in 1937. Since then it has been seen in many regions around the world, but apparently first identified in North America in 1999, with encephalitis reported in humans and horses. Subsequent to this it has spread through the Eastern half of the United States and the Gulf Coast. The spread continues, and it is likely cases will occur throughout the country.

2. Transmission. West Nile virus is transmitted during the bite from an infected mosquito (vector, culex mosquitoes) that has become infected from feeding on infected birds (reservoir hosts). The infected mosquito then transmits the West Nile virus to humans and animals during a blood meal feeding. The virus is located in the mosquito's salivary glands, and thus can be injected into the animal or human host during the feeding process. There is no documented evidence of person-to-person or animal-to-person transmission of West Nile virus; the mode of transmission is the mosquito.

3. Clinical issues

a. While anyone who gets mosquito bites from the West Nile virus infected mosquitoes can be at risk for West Nile virus disease, severe illness is generally limited to those over age 50 and those who are immune compromised. The incubation period in humans ranges from 3-15 days.

b. Most West Nile virus infected persons have no symptoms. A small proportion develops mild symptoms that include fever, headache, body aches, and, on occasion, skin rash and lymphadenopathy. Less than 1 percent of infected persons develop more severe illness that includes encephalitic symptoms, such as headache, high fever, neck stiffness, stupor with potential for coma, seizures, muscle weakness and paralysis. Of the few people who develop encephalitis, a small proportion die, but overall, this is estimated to occur in less than one out of one thousand infections. Diagnosis is generally made through a high index of clinical suspicion and on results of specific laboratory tests that include serum and/or cerebrospinal fluid.

c. When interpreting these serologic tests, consider that due to close antigenic relationships among flaviviruses, persons recently vaccinated with yellow fever or Japanese encephalitis vaccines or persons recently infected with a related flavivirus may have positive test results on IgM antibody tests for West Nile virus. Also, because most infected persons are asymptomatic and because IgM antibody may persist for 6 months or longer, residents in endemic areas may have persistent IgM antibody from a previous infection that is unrelated to their current illness.

d. There is currently no Federal Drug Administration (FDA)-approved vaccine for the West Nile virus. In addition, there are no specific therapeutic agents for this disease and intervention is primarily supportive, prevention of secondary infections, and, for severe cases, requires an intensive care unit. Ventilatory support may be critical.

4. Prevention. Prevention of West Nile Virus infection rests on two strategies:

a. **Reducing the Number of Vector Mosquitoes.** Reduction in the number of mosquitoes available to bite humans can be accomplished through eliminating breeding areas for mosquitoes in locations where they may co-habit with humans. To decrease the number of mosquito bites it is logical to limit the number of places available for the mosquitoes to lay eggs, and this is usually standing water. All areas, therefore, should be checked for items such as old tires that may contain water or any other containers, such as those for plants, which may have standing water after rain. Mosquitoes can breed in any of these sites. Examples of other areas of concern are ponds or water features on the property, the covers on equipment that may present hollow surfaces for standing water, or debris, such as pieces of plastic sheeting, where water may accumulate. Where appropriate, participate with the local public health agencies in abatement plans for the reduction of mosquito breeding sites.

b. **Preventing the Mosquitoes from Biting Humans.** In areas of high mosquito intensity, greater than one thousand bites per hour can occur, and this is to be avoided. Specifically, if possible, it may be prudent to stay indoors at dawn and dusk, and in the early evening. Clothing should include long-sleeved shirts and long pants when outdoors in mosquito-laden areas. Clothing can be sprayed with repellants containing permethrin or N,N-diethyl-meta-toluamide (DEET) since mosquitoes may bite through thin clothing. Insect repellent should only be applied to exposed skin and not to skin under clothing. An appropriate repellent will likely contain approximately 35 percent DEET; higher concentrations than 35 percent offer no significantly greater protection. Label directions should be followed at all times if any insect repellent is used. This is particularly relevant since most will irritate eyes and mouth, and care must be taken with use of all such products.

5. Conclusion. The key to addressing the issue of West Nile Virus are:

- a. First, prevention;
- b. Second, heightened awareness that patients or employees with this disease, even in the mild forms, may present for care;
- c. Third, a high level of suspicion for any patient or employee who presents with any encephalitic or meningitic symptoms; and

d. Fourth, aggressive supportive care for such patients with meningitis or encephalitis including intensive care unit support (including ventilation) as appropriate.

6. References

a. CDC. West Nile Virus Activity – United States, 2001. Morbidity and Mortality Weekly Report (MMWR) 2002; 51:497-501.

b. CDC. Division of Vector-Borne Infectious Diseases. West Nile Virus Homepage. <http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>

c. “CDC Responds: Update on West Nile Virus For Clinicians and Laboratorians.” A Program and Public Health Training Network satellite broadcast aired August 8, 2002, and located at web site: <http://www.phppo.cdc.gov/PHTN/webcast/westnile>

d. CDC. Epidemic/Epizootic West Nile Virus in the United States: Revised Guidelines for Surveillance, Prevention and Control. From a workshop held in Charlotte, NC, January 31-February 4, 2001.

e. Tsai, T.F. “Flaviviruses (Yellow Fever, Dengue, Dengue Hemorrhagic Fever, Japanese Encephalitis, St Louis Encephalitis, Tick-Borne Encephalitis),” published in Mandell, Douglas, and Bennett’s Principles and Practice of Infectious Diseases, 5th ed. Vol. 2, Chapter 142, pgs. 1729-30. Churchill Livingstone, Philadelphia, PA.

f. Petersen, L.R, Marfin, A.A. “West Nile Virus: A Primer for the Clinician,” Annals of Internal Medicine, 137(3), Aug 6, 2002.

g. United States Geological Survey (USGS) Center for Integration of Natural Disaster Information. West Nile Virus Maps 2002. National and State Maps. Webpage address: http://cindi.usgs.gov/hazard/event/west_nile/west_nile.html

7. Contact. Questions regarding West Nile Virus infections can be referred to the Office of the Program Director for Infectious Diseases, Gary A. Roselle, M.D., at (513) 475-6398.

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